Baytown's New MEK Unit *By Jackson Lee Nesbitt*

The HUMBLE WAY

MAY-JUNE, 1948

The HUMBLE WAY

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A Board Chairman, A New President, And Two New Directors

On May 10 at the annual meeting of the stockholders and of the Board of Directors of Humble Oil & Refining Company, Mr. H. C. Wiess was elected Chairman of the Board, Mr. Hines H. Baker was elected President, Mr. Morgan J. Davis and Mr. C. E. Reistle, Jr., were elected new members of the Board of Directors, and all other directors and officers were re-elected. The present Board consists of ten members who have an average of 27 years' service with the Company, ranging from 12 years to 31 years. The members of the Board are as follows: H. C. Wiess, Hines H. Baker, L. T. Barrow, David Frame, D. B. Harris, J. A. Neath, Rex G. Baker, H. W. Ferguson, Morgan J. Davis, and C. E. Reistle, Jr.

Because of the additional responsibility and work of the chief executive of the Company brought about by the growth of the Company, the by-laws were amended at the annual meeting of the stockholders to divide the responsibility and work between the Chairman of the Board and the President. The Chairman of the Board is the principal officer of the Company and the President is the chief administrative officer of the Company, responsible for the execution of plans and policies authorized by the Board of Directors. In the absence of either of these two principal executives, the other assumes the duties of both offices.

Mr. H. C. Wiess, an organizer of the Company and member of the Board of Directors since 1917, was elected Chairman of the Board of Directors on May 10, 1948, after having served as President since 1937, as Executive Vice President of the Company from 1933 to 1937, and as Vice President from 1917 to 1937. From 1919 to 1933, Mr. Wiess was in charge of the Company's refining operations, and for much of that period was also in charge of the Sales Department. He has had broad experience in all phases of the Company's work.

Mr. Hines H. Baker, the new President, joined the Company in 1919 as a lawyer. Later he had experience in conservation and production problems, refining, sales and general administrative work. In 1937 he was elected a member of the Board of Directors, in 1941 he was elected Vice President, and in 1945 he became Executive Vice President. Subject to the Board of Directors, the President is responsible for supervision and control of the operations of the Company.

Mr. Morgan J. Davis and Mr. C. E. Reistle, Jr., the new members of the Board, will continue to be managers of the Company's Exploration and Production Departments. Morgan Davis came with Humble as a geologist in 1925 upon his graduation from the University of Texas. After four years with Humble, Mr. Davis joined an oil company in the Dutch East Indies where he served as Resident Geologist in Java and Sumatra and led geologic expeditions into various regions on the several islands of the Archipelago. Mr. Davis returned to Humble in 1934 as District Geologist in New Mexico and became Gulf Coast Division Geologist in 1936. He was appointed Chief Geologist in 1941 and Manager of the Exploration Department in July, 1946.

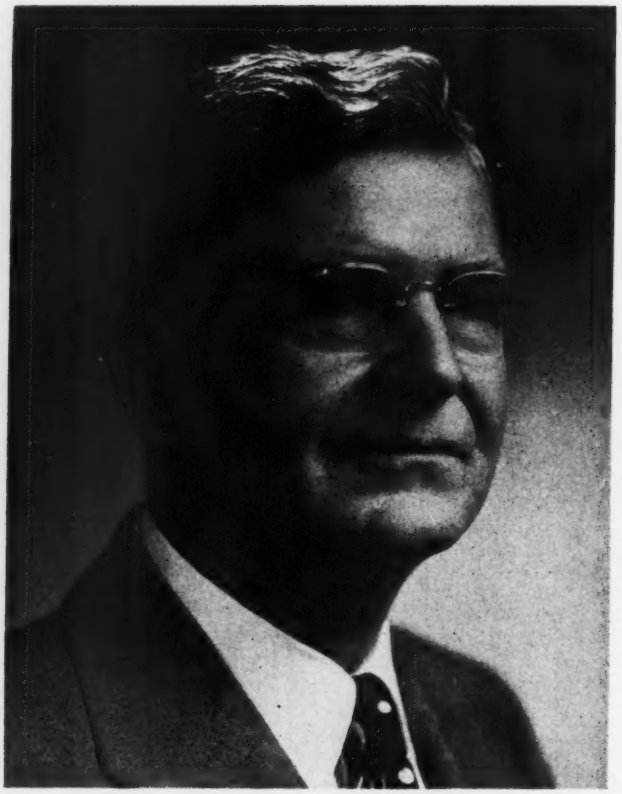
Mr. C. E. Reistle, Jr., joined Humble as Assistant Chief Petroleum Engineer in August, 1936. He received a Chemical Engineering degree from the University of Oklahoma in 1922. He worked for the U. S. Bureau of Mines from 1922 until 1933, in which year he became Chairman of the East Texas Engineering Association, which had been organized for the purpose of obtaining engineering facts necessary to proper regulation of production in the great East Texas oil field. Mr. Reistle was appointed Chief Petroleum Engineer for Humble in 1940 and Manager of Production operations in 1945.

At the annual meeting of the stockholders a resolution was approved authorizing amendment of the charter so that value of the capital stock could be increased from $300,000,000 to $475,000,000 in order to bring capital stock more nearly in line with the present net investment in fixed assets of $481,690,000. In recommending this change, Mr. Wiess stated that the Company has followed the practice of retaining a large part of earnings in the business each year for reinvestment, mainly in the form of such fixed assets as leases, producing wells, natural gasoline plants, refineries, service stations, and other physical equipment. Over a period of years, this practice of reinvesting earnings in the business had brought about a wide gap between net investment in fixed assets and capital stock, thus making it desirable to amend the charter. The change in the value of capital stock does not affect the number of shares authorized, which remains at 18,000,000 shares without par value.

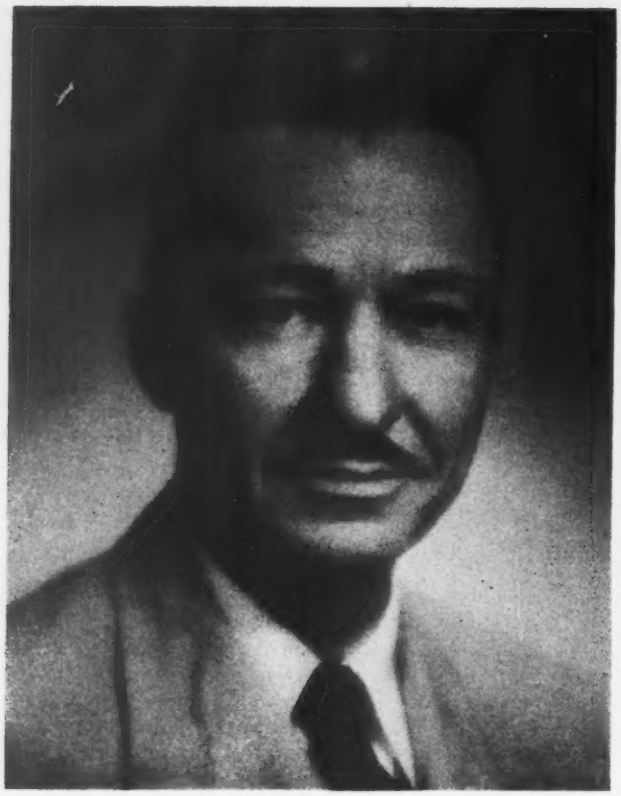
Pictures on Page 2

Waterspout approaching Humble's drilling platform in the Gulf of Mexico off Grande Isle, Louisiana, was one of several that formed while newsmen were visiting the rig. (See *Newsmen's Tour*, Page 6)

Board Chairman H. C. Wiess

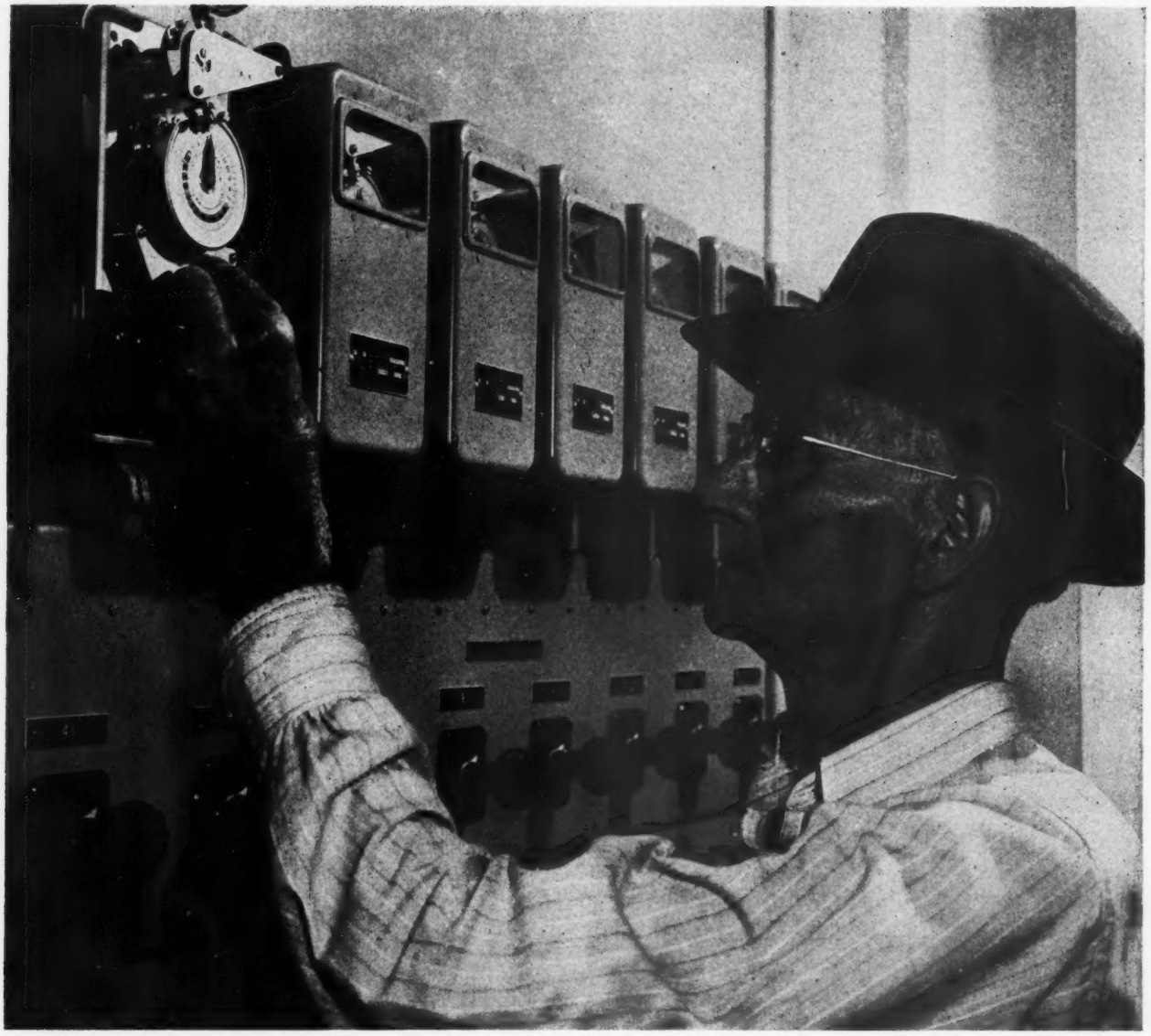


President Hines H. Baker



Director Morgan J. Davis

Director C. E. Reistle, Jr.



LEASE PUMPER A. M. Reece sets the clock on a well switch as he observes the operation of new equipment which automatically controls the flow of 31 wells into the five storage tanks on Coolidge battery No. 1. Pumpers formerly had to walk to each well every day.

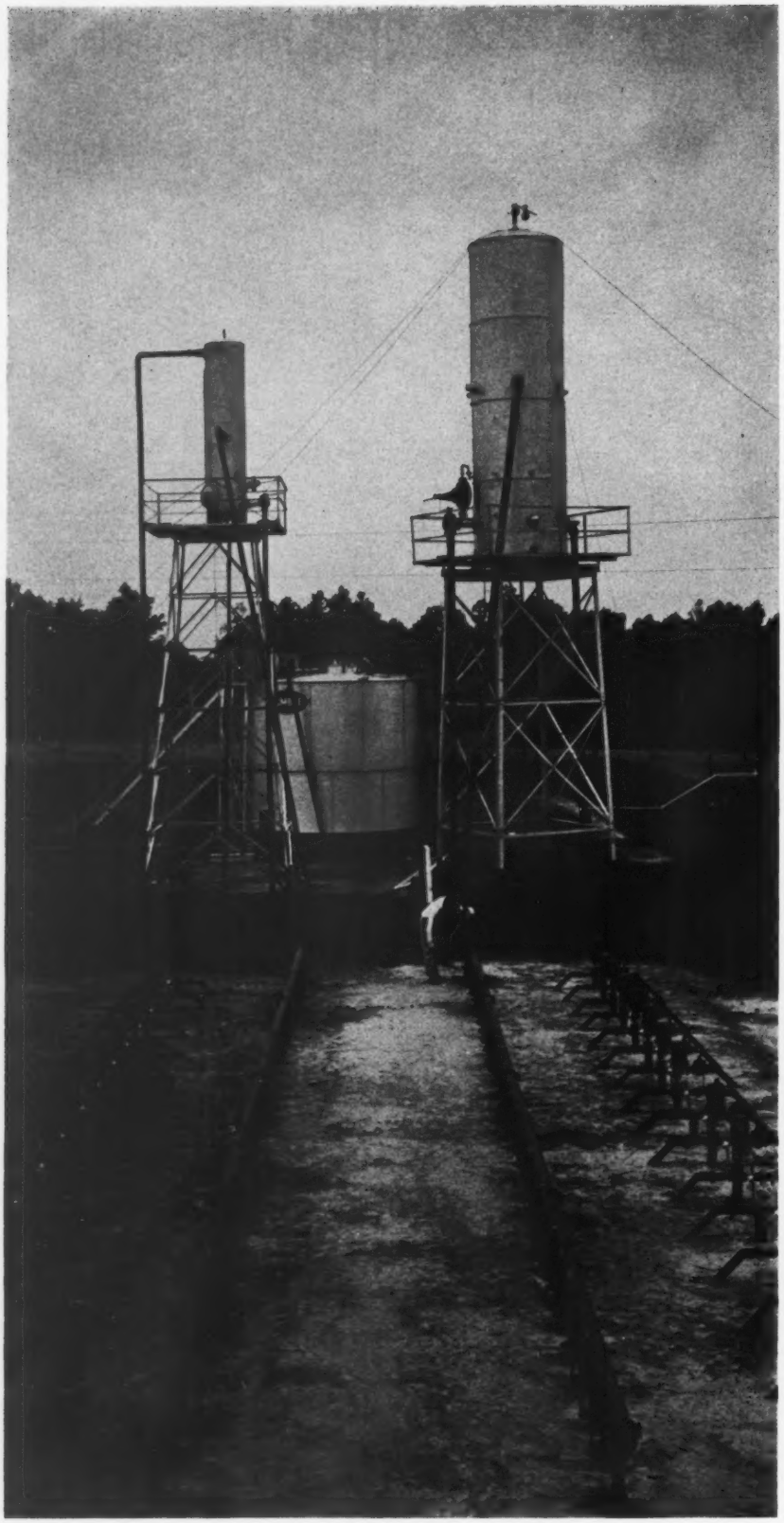
Pumper's Helper

Oil production made simpler, more efficient by automatic equipment on East Texas tank battery

ON THE Coolidge tank battery No. 1 in the heart of the East Texas field, lease pumpers A. M. Reece and "Chief" J. W. Pickens have a helper who does all the work—almost. That helper is the new equipment which automatically flows the 31 oil wells into Coolidge battery No. 1 and switches the valves as each 500-barrel stock tank is filled. Nowadays the two lease pumpers make out their run tickets on the oil produced and settle back to watch the battery perform by itsef.

Electric valves, controlled by automatic timers on the panel in the pumper's office, operate Coolidge battery No. 1. The system of clocks and switches permits the wells to produce their daily allowable of about 21 barrels each, one-at-a-time, throughout a 24 hour day. Since each well is adjusted to flow its allowable in about 44 minutes, the flow of oil to the tanks is almost continuous.

Under current regulations East Texas field wells are permitted to produce approximately 20 days per month, and Coolidge battery 1 wells are on a five-day week. The two non-productive pro-



ELECTRIC VALVES flanking the headers in the foreground control the flow of oil from the wells to the gas separator and storage tanks beyond. Pumper Reece checks the flow pressure.

rated days each week are automatically accounted for as the clocks work through a seven-day cycle. A change in the schedule requires only small adjustments.

All 31 wells flow into a header line and through a gas separator into one of the five storage tanks. As a tank is filled, the valves automatically switch the flow to the next tank. If that tank is delivering oil to the pipe line, or is withheld from service for another reason, the flow of oil is switched to the next empty tank. Thus the lease pumpers merely make minor adjustments, observe the battery's operation, and report the production.

Another improvement allows pumpers Reece and Pickens to gauge the amount of oil in the stock tanks from the ground. From a direct-reading gauge at each tank, they can now check the amount of oil in each tank without climbing to the top and lowering a gauge line in the conventional manner. The new gauges, connected to floats inside the tanks, may be easily read at eye-level.

Any part of the automatic system may be switched off whenever necessary. In event of some irregularity, the lease pumper may control the battery manually as required.

Should the electric power supply fail, the entire system goes off and no oil is produced, as all valves are normally closed when the power is off. When the electricity comes on again, the battery resumes normal operation without any delay or assistance.

Until April 7 of this year, when the new equipment was put into operation, taking care of production on the Coolidge lease was quite a job. Pumper Reece managed 16 wells, and on his eight hour tour he had to walk to each one, turn the valve to flow the well, and return to shut the valves when the production was made. "Chief" Pickens did the same thing on the remaining 15 wells. Walking over the hills and through the gulleys on the 204-acre tract and doubling back to shut off production left little time for other work on the lease.

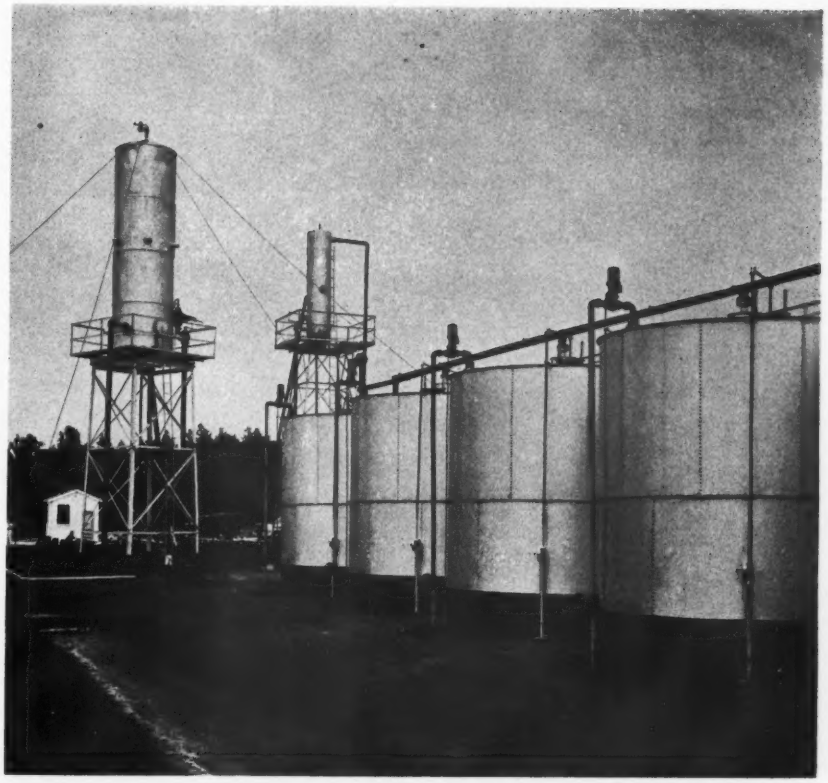
Many a step has already been saved by the new equipment. The wells must still be checked often, but not daily as before; now the work centers around the control panel in the little office. With the wells controlled automatically there is more time for the pumpers to check the individual performance of the wells, and to maintain closer supervision of the production.

As the battery is now operated, pumper Reece's first well begins to flow shortly after 2 A. M. As it shuts off, the second well is flowed, followed by the others. The sixth well is flowing when Mr. Reece arrives at 6 A. M., and at 2 P. M. when he leaves, the 16th well shuts off. The same procedure occurs on the remaining 15 wells which flow during the rest of the day and through Mr. Pickens' tour from 6 P. M. to 2 A. M. Under this schedule, each pumper has a close check on each of his wells by the end of his tour. To assist in checking the performance of the system, a recording pressure gauge is installed on the flow header which provides a record of the flow of each well throughout the day. If a well fails to flow, the pressure record reveals which well is inoperative.

The time switches installed on the control panel of Coolidge battery 1 are the same type which are installed on many electric pumping units in the field. They turn the wells on and off at set times each day and operate on a seven-day cycle. The valves they control are operated by small all-enclosed electric pumps which hydraulically force a plunger against a spring to open the valve. The valve remains open as long as the circuit is energized, and is closed by the spring when the current is cut off. All switches are explosion-proof and shielded, and all wires are sealed in conduits to prevent any accumulation of gas in the electrical system.

Installation of the automatic equipment on Coolidge 1 battery enables pumpers Reece and Pickens to manage the battery in the most efficient way with a minimum of effort. As more such batteries are placed in operation other advantages will be realized. Chief among these will be improved operations of the nearby London gasoline plant when a uniform supply of gas is provided. Through the extended use of such automatic equipment as that on Coolidge battery No. 1, gas production from the 1,681 wells serving the London plant can be maintained fairly constant, thus making possible greater utilization of the gas produced in the area.

The development of automatic equipment for tank batteries is a part of the effort of the Petroleum Engineering division being directed to making oil production simpler and more efficient. Improvement of facilities and methods in almost every phase of operations is being sought to make the work easier, safer, and more productive.



ELECTRIC VALVES atop lines to each tank are switched automatically to fill storage tanks. Pumpers office, where control panel is located, may be seen beyond the gas separator (tower).

PUMPER REECE checks the oil level in a storage tank on a direct reading gauge located at eye level. Note the gauge installations on the near side of each tank in the photo above.

Newsmen's Tour

On May 17, 18, and 19, more than 50 newspaper and oil trade publications writers, photographers, and radio men were Humble's guests on a conducted tour of Grand Isle and surrounding operations. Many of them came from Texas, Louisiana, and Mississippi; others were writers for national magazines, and for newspapers in New York, Chicago, Boston, and other leading cities in the North and East.

Those on the tour heard a full discussion of tidelands operations, including a history of swamp and water drilling, a detailed summary of the tidelands question, and the actual mechanics of exploring for oil on the Continental Shelf. They learned that the Shelf offers the best possible hunting ground for new oil reserves, that oil companies are well equipped to search for and produce that oil, and that, no matter who owns the Shelf, exploration and drilling must continue.

Headquarters for the tour was at New Orleans. Among the activities of the busy three-day period were trips to the Delta Farms oil field and to several Humble production camps, two airplane flights over operations in the Gulf of Mexico, a rather detailed inspection of the giant platform and drilling rig eight miles off Grand Isle, and a number of talks by Humble executives and field operations personnel. On several occasions, question-and-answer meetings gave guests an opportunity to learn more about the installations they had seen, or were about to see.

At the conclusion, newsmen agreed that the tour was interesting and informative. Even Nature did her part. While the group was aboard the drilling platform off Grand Isle, squally weather bred a number of impressive waterspouts in the surrounding Gulf and sent them whirling dramatically around the structure. Mel Coston, HUMBLE WAY staff photographer, made several pictures of these waterspouts, one of which is on this page. It is this picture that was reproduced in a two-page spread in the June 7 issue of *Life*, where it was hailed as "one of the rarest meteorological pictures ever taken."

TWIN WATERSPOUTS envelope a partially completed Humble drilling platform and derrick, and a third one dips down at left. This picture was made from the big drilling platform from which newsmen watched seven such spouts form and spend themselves within a period of ten minutes. Columns of the spouts, composed mainly of rainwater, are estimated to be from 20 to 30 feet wide; from 250 to 300 feet high.

IN NEW ORLEANS Board Chairman H. C. Wiess welcomed the group of writers (above) and laid for them a background of oil industry operations and problems. Assistant chief geologist J. Ben Carsey explained the basic geology of the Gulf Coast area and the Continental Shelf, and assistant division petroleum engineer J. C. Posgate traced the history and development of swamp and marsh drilling operations. From New Orleans the group traveled by bus to Barataria and from there by boat (below) to the Delta Farms oil field for an inspection of barge drilling operations.

AT GRAND ISLE. In the final meeting of the tour President Hines H. Baker (above) presented a detailed discussion of the tidelands question. The day before, chief geophysicist D. P. Carlton had shown a motion picture and explained exploration work in Gulf waters; Division petroleum engineer J. S. Boldrick had discussed deep-water drilling problems. Prior to the final meeting, the press group made a boat trip out to Humble's big drilling platform eight miles off shore. Below, one of three boats is shown unloading newsmen for an inspection of the platform.

Vacationlands for All

First of two articles about Texas State Parks, noting those located in the western half of the state

WHEN vacation time rolls around, and the open road beckons, the colorful State of Texas plays host to thousands of tourists from all North America.

The grandeur and magnificent variety of Texas scenery, "local color" of the ranch and oil businesses, historic sites, bustling cities, and shining new industries offer a powerful lure to the sightseer.

Perhaps the open spaces are most popular with vacationers, and wherever the tourist or Texan may be within the state's borders, Texas offers a scenic vacationland nearby . . . for the State of Texas has developed a far-flung system of 36 state parks for the enjoyment of all and the preservation of natural scenic wonders.

Whatever the vacationer's likes may be—fishing, riding, camping, boating, swimming, golfing, or just plain "restin'" in cool, beautiful surroundings—there is a Texas State Park to please him.

Developed and maintained by the volunteer State Parks Board, the Texas parks system has grown since its beginning in 1923 to one of the best in the nation. More than two and one-half million visitors during 1947 give testimony of the system's popularity.

One of the most popular of Texas parks is Garner State Park, named in honor of former vice president John Nance Garner. Located on the crystal-clear Frio River, 26 miles north of Garner's home in Uvalde, its breathtaking views, crags, foothills, huge trees, and wild deer make it the "sparkling jewel" of Texas parks.

Garner State Park's 640 acres include the highest point in Uvalde County—elevation 2,008 feet—and 10 miles of winding trails which take the hiker or horseman from the mosses and ferns of the swift river to the mountain tops.

From the park entrance on U. S. Highway 83, the road winds its way around heavily wooded hills, high above a green valley. Descending toward the Frio River, the visitor first glimpses the park's attractive stone concession building and cabins, built of native rock and rough-hewn timber, in a grove of trees above the spring-fed river.

The concession building's huge outdoor dancing terrace is a favorite spot for evening parties, and meals are served in the building's rustic dining room.

Swimming and fishing are favorite pastimes at Garner. Below the dance terrace is a deep, sparkling river pool which has been improved for swimming and water sports. Fishermen often catch strings of seven-to-eight pound bass, and the river also abounds in channel catfish and perch. The park's winding trails make horseback riding another favorite sport.

Eighteen tourist cabins, each with one large bedroom, screened sleeping porch, kitchen and bath, are provided with simple furniture, butane cooking facilities, ice boxes, rock fireplaces, and modern plumbing. These cabins are typical of most in the Texas parks system. A lodge is also available for larger parties.

For free printed information on any Texas State Park write to Humble Touring Service, Humble Oil & Refining Company, P. O. Box 2180, Houston, Texas; or to the Texas State Parks Board, Austin, Texas.

For those who prefer the outdoor life, there are camping and picnicking sites located along the river, gracefully shaded by big oak, elm, pecan, cypress, and red haw trees.

Some 250 miles further west in the state is the Davis Mountains State Park—1,540 acres of some of the most rugged scenery in Texas, with mountains ranging in height from 4,500 to more than 8,000 feet above sea level. The Davis Mountains are second in general elevation only to the Guadalupe Mountains among ranges in Texas. The park is located five miles from historic Fort Davis on Texas Highway 118.

In this lofty setting stands a unique and picturesque park building—Indian Lodge, sometimes called "mile high hotel." Built of adobe in Indian pueblo style, its many different levels cling to a steep mountainside among cactus and century plants, overlooking a sweeping canyon which reveals mountain ranges as distant as forty miles away. The lodge itself, the Davis Mountain Peaks, and the wild game make Indian Lodge a favorite of photographers, artists, and nature lovers. Antelope, deer, coyotes, bear, and other wild game range the hills, and overhead golden eagles may be seen.

Furnishings in the 16 apartments in the lodge are made of massive, rough-hewn timbers, and all decorations are in Indian style. Each room has a private outside entrance and all modern conveniences. Fireplaces lend a warm glow to the evenings, for the park's magnificent sunsets are accompanied by a sharp chill in the air, even in midsummer.

A spacious lounge is available for parties and evening gatherings, and opens to an outside dancing terrace. All

types of native wild flowers and cactus, yucca, and century plants bloom in a patio. Meals are served in a brightly decorated dining room on the lower level.

Hiking, mountain climbing, and horseback riding are popular sports. A 74-mile scenic loop through the mountains, skirting the highest peak, Mount Livermore, is a drive most visitors enjoy thoroughly. A nearby attraction is McDonald Observatory, atop Mount Locke. This celebrated observatory, jointly operated by The University of Texas and the University of Chicago, is open to visitors three afternoons each week. Also nearby are the ruins of Old Fort Davis, established in 1854 by Secretary of War Jefferson Davis to protect pioneers from savage Apaches.

If the vacationer enjoys swimming, he can make a 35-mile mountain drive from Indian Lodge to the largest walled swimming pool in the world at Balmorhea State Park. The huge pool, in the shape of a horseshoe, encircles San Solomon Springs, which flow 26 million gallons of water daily. This park also offers Spanish-style tourist cabins, concession building and dining room, playground equipment, and shaded picnic areas.

Both Balmorhea and Davis Mountains State Parks are within easy driving distance of the Carlsbad Caverns in New Mexico and Big Bend National Park, south of Alpine and Marathon, Texas.

Journeying to central Texas, the vacationer will find fishing, swimming, and boating attractive at the 36th Division State Park near Brownwood. This park's 538 acres lie along Brownwood Lake, with its ten thousand acres of water and 100-mile shoreline. Boating and speed boat racing are popular, and boats are available for rent. Fishing for bass and crappie is especially good, and hunting is allowed in areas near the park. A

GARNER STATE PARK near Uvalde, with miles of trails winding from the sparkling Frio River to wooded hill tops, provides a striking setting for horseback riding, a favorite sport there. Here a student riding party gathers near the park's rustic concession building.

COOL, SHADED PICNIC areas invite thousands to Texas State Parks each year. This family opens a bountiful lunch basket at Garner Park; they may later swim in a deep Frio River pool.

BALMORHEA STATE PARK in the Davis Mountains surrounds the largest walled swimming pool in the world. The tremendous pool is fed by 26 million gallons of pure spring water each day.

BOATING, swimming, fishing are popular at 36th Division State Park near Brownwood. Vacation cabins are near lake's shoreline.

wide sand beach and stone bathhouse invite swimming.

Seventeen rock cabins, similar to those previously mentioned, and soft lake shore breezes combine to offer cool, comfortable vacations or week-ends. Camping and picnicking sites are located along the lake shore.

The park is centered around a large clubhouse, playground, dancing terrace, and boat docks. Meal service is available at the clubhouse.

Another "fisherman's paradise," according to central Texas anglers, is Possum Kingdom State Park, where the Brazos River has been dammed near Mineral Wells to form huge Possum Kingdom Lake. The lake is a favorite of bass fishermen, and also abounds in crappie and catfish.

Possum Kingdom Park includes 6,969 acres of heavily-wooded mountainous country, lake, and scenic lake shore drives. Its development has emphasized the fisherman's needs by providing a ten-room barracks, six modern tourist cabins, tents for camping, small concessions building, and boats and boat docks on the west side of the lake. Accommodations on the lake's east shore include 22 cabins, making a total of 28 in the park.

The name of the lake and park was passed down by Indians, who called the area "possum heaven," according to local residents. "Possum" still abound in the vicinity.

Visiting the Texas panhandle, the vacationer will find the level, placid plains near Canyon deeply scarred by a color-flaming chasm, its gorges and strange rock formations spreading into three counties. This is famed Palo Duro Canyon, which has been developed into the largest of Texas State Parks—15,103 acres. The giant canyon is 60 miles long, 1,500 feet deep, and ranges in width from a few rods to 15 miles.

Park development has provided 15 miles of scenic drives, 20 miles of bridle trails, 30 miles of hiking trails, dude ranch accommodations, 150 picnic units with conveniences, modern stone cabins on the canyon rim, El Coronado Lodge, and the Park Tavern. Saddle horses and pack burros are available.

Remnants of camps and dugouts of the first pioneer settlers of the Panhandle still remain in the canyon. Among

the more spectacular sights are Triassic Point, with its red sandstone layers; the yellow, green, white, blue, and red formations in Sunday canyon; and gigantic rock "toadstools" fifty feet high. The Smoky Rock Garden area has yielded many Indian relics and fossils to searchers, as have other areas in the park.

Other Texas State Parks in the western part of the state are listed below:

ABILENE: 20 miles southwest of Abilene near Buffalo Gap. Swimming pool, picnicking, dance terrace, and playground.

BENTSEN-RIO GRANDE VALLEY: Park under construction near Mission. A typical subtropical jungle, unique birds and wildlife.

BIG SPRING: Unusual scenic drive and lookout point on high mesa. Picnicking.

BLANCO: Located on Blanco River where it crosses U. S. Highway 281. Camping, fishing, swimming, picnicking, and boating. Unfurnished cabins.

FORT GRIFFIN: Park to be developed on the Brazos River near Albany. Ruins of old Fort Griffin. Camping and picnicking.

FRIO: On Frio River near Pearsall. Fishing, camping, and picnicking.

INKS LAKE: Ten miles west of Burnet. Connected by scenic drive with Longhorn Cavern. Boating, fishing, camping, picnicking, dance terrace.

KERRVILLE: On Guadalupe River near Kerrville. Fishing, picnicking, camping, and horseback riding.

LOCKHART: Two miles southwest of Lockhart. Picnicking, lookout, dance terrace, golfing, swimming.

MACKENZIE: In city of Lubbock. Golfing, swimming, picnicking, dance terrace, and amusement center.

MINERAL WELLS: Picnicking and camping facilities.

PALMETTO. On San Marcos River near Luling. Unusual tropical plants in Palmetto swamps. Concession building, dance terrace, picnicking and fishing.

SAN JOSE MISSION: National historic site, one mile south of San Antonio on U. S. Highway 281.

INDIAN LODGE, pueblo-style hotel in the rugged Davis Mountains State Park near Fort Davis, stands 5,300 feet above sea level. A 74-mile loop takes sightseers through the mountains.

PALO DURO CANYON'S color-flaming gorges spread 60 miles across the Texas Panhandle. Drives and bridle trails lead through the canyon from the park's lodge and cabins on the rim.

THE BASS FISHERMAN'S choice is Possum Kingdom State Park near Mineral Wells. These anglers try for big ones lurking near shore.

Pipe Still

Artist Jackson Lee Nesbitt, in painting Pipe Still No. 3 at Baytown refinery, chose for his subject one of the plant units which produces raw stocks from which motor oils are made *(MEK Makes 997*, page 14). Distillation, the primary step in lubricant manufacture, separates from the rest of the crude oil that portion which has good lubricating properties.

In early days, distillation processes were crude and inefficient, and product quality was necessarily far below today's standards. Now, with advanced research and technology and with vastly improved equipment, refiners obtain more lube stocks from the crude oil and make lubricants of far better quality than ever before.

Chief advantage of the pipe still over earlier types of distillation equipment so far as lubricants are concerned, is that oil need not be retained in the still for so long at high temperatures. As a result, there is less loss of valuable lube stocks from cracking, or decomposition.

Those motor oil stocks which contain wax are sent from the pipe still to lube dewaxing plants, such as the new MEK Plant on the front cover.

Construction will begin this year on Pipe Still No. 4, making it possible for Baytown to produce still more stocks for manufacture into gasoline and lubricating oil.

UTILITY AND BEAUTY are combined in these tall silver vessels at Baytown refinery's new MEK Plant which went into operation early this year. Vessels at left hold solvent from which the lubricating oil plant gets its name (methyl ethyl ketone). Others hold oil, wax.

MEK MAKES 997

New motor oil dewaxing unit recently completed at Baytown doubles output of premium lubricants

AT LEAST part of the cryptic title of this article holds no mystery for Humble employees and customers. They know that 997 means motor oil . . . that "997 is a good number," synonomous with quality . . . and that 997 is manufactured at Humble's Baytown refinery.

But the MEK is something else again. It is the newest refinery unit for manufacturing premium quality motor oils and lubricants. Everyone at Baytown calls it the MEK Plant, but it is known more formally as the Benzol-MEK Dewaxing Plant. Not only do its initials satisfy the American passion for abbreviation; they save non-technical people the tongue-twisting embarrassment of repeating *methyl ethyl ketone*, the principal component of the solvent from which the plant gets its name.

It would be pleasant to report that the new MEK Plant has increased the total daily output of lubricating oils since it went into operation in March of this year, but it hasn't; not by so much as a barrel. What it has done—and in this lies its worth—is to increase production of *premium quality* motor oils by nearly 100 per cent! This has been done by using MEK facilities in conjunction with the Phenol Extraction Plant to replace a large part of the Baytown production of intermediate quality lube oils with premium quality oils.

The significance of this new plant can best be understood by acquiring at least a nodding acquaintance with lubricants and their uses.

The first lubrication problems came into existence with the invention of the wheel, but they were small problems. For many centuries, up to and including the days of creaking oxcarts and covered wagons, a lubrication engineer would have been about as useful, and would have aroused as much curiosity, as an aviation expert at King Arthur's Court. A little animal tallow, perhaps a bit of "b'ar grease," was all the pioneers needed to keep their Conestogas rolling across the prairies.

With the invention of the internal combustion engine, however, came a whole new host of lubrication problems. High pressures, extremely high temperatures, and high speed metal-to-metal contact in these engines brought many a headache for lubrication specialists. They had to trade their beds for lanterns and go to work in earnest.

The fact that oil had been in use long before the internal combustion engine was invented was not merely another indication of that singular good fortune which has shaped so many courses in our national history. It simply had to be that way. Oil to supply fuels and lubricants in enormous quantities had to be available before the automobile could become anything but a plaything of the very rich, an occasional monster to frighten the well-bred horse.

There seems to be no escaping this fact: Oil, the ideal source of fuels for moving machines . . . oil, the best lubricant in the world . . . was a cause, not a result, of our present Machine Age.

What makes oil such a good lubricant? Why not use water, or turpentine, or alcohol, or any other of thousands of different liquids? Simply this: oil is

MEK PLANT at Baytown is latest addition to refinery process units. Use of this new unit in conjunction with others has increased production of premium motor oils by nearly 100 per cent.

SAMPLES SHOW what goes into the MEK Plant and what comes out. Operator holds (in the usual order) feed stock, wax, and dewaxed oil.

TAKING A LOOK to make sure that knives are revolving inside the chilling pipes while the oil is dewaxed. Knives keep pipes free of wax.

far better than any other liquid because it *sticks to surfaces and stays there*, with relatively little change in composition, under all sorts of operating conditions. If water could "hang on" as well as oil, and not turn into steam when it gets too hot or turn into ice when it gets too cold, water would be equally as valuable as oil for lubricating moving surfaces.

It is, of course, somewhat loose and inaccurate to make the flat statement: "Oil is a good lubricant." More properly, it should be: "Some oils are good lubricants." The plain truth is, not all crude oils are sources of good motor oils; some of them contain hydrocarbons which have excellent lubricating properties; others are practically worthless as a source of lubricants. The gasoline refiner can use almost any type of crude oil and come up with a relatively good grade of gasoline, if he has the proper equipment and technical skill. Not so the motor oil refiner. Besides equipment and skill, he must have an adequate supply of the right kinds of crudes.

It is more complicated and considerably more expensive, volume for volume, to make motor oil than it is to make gasoline. The investment in facilities, on the basis of dollars required per barrel of daily capacity, has to be much greater. A wide variety of equipment is necessary. The only honest answer to a refinery visitor's request to see "the unit where you make motor oil," is to tell him: "There isn't one." A half-dozen or so units, all working together, are needed to make premium motor oils. Each unit has its place in the overall manufacturing process, and to leave out any one would sacrifice some of the desirable qualities of the finished product.

The refiner who makes motor oils from several types of crudes needs most, if not all, of this equipment: distillation equipment to produce proper charge stocks; a deasphalting unit for those oils that contain asphalt; solvent dewaxing equipment to remove wax; an acid treating plant to remove impurities and improve color; a solvent extraction plant to remove materials which would form sludges and varnishes in the motor, and those which would cause the oil to become thin at high temperatures or heavy and viscous in cold weather; filters to strain the oil; and a blending and compounding plant to put the final products together.

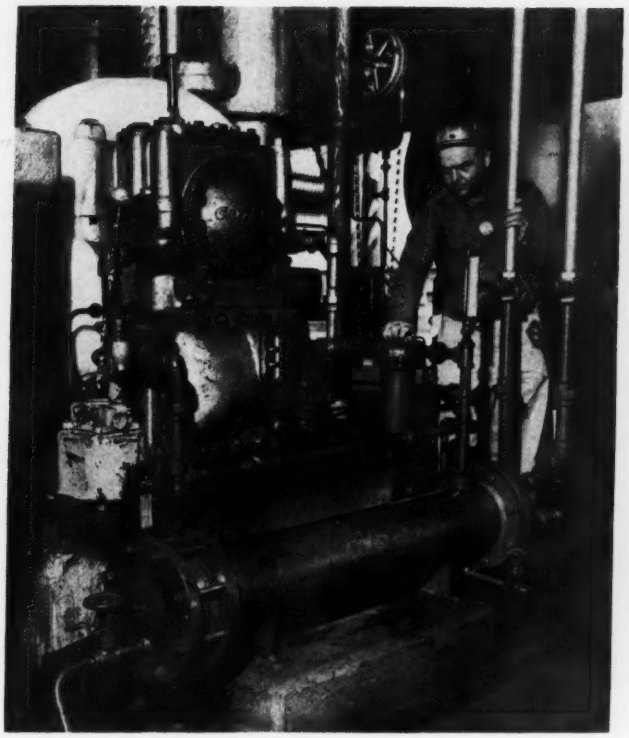
Of all these processes, solvent dewaxing is the most expensive and most important. Wax in itself is not a particularly harmful substance, but it must be removed to allow free and easy starting in cold weather.

Briefly, here is the way Humble's MEK Plant works at Baytown:

Oil to be used as feed, or charge stock, for MEK lube dewaxing comes from distillation units such as pipe stills. These oils are called "lube distillates," or heart cuts of the crude.

As the feed stream enters the MEK Plant, it is mixed with a solvent made up of methyl ethyl ketone, benzol, and toluene. This solvent has one purpose, and only one: to keep the oil thin, so that dewaxing can be carried on efficiently and economically. If no solvent were used, process equipment such as flow lines and heat exchangers would become hopelessly clogged with wax in a short time. The works, to be brief, would be literally "gummed up."

The solvent-and-oil mixture goes first to chillers, which in this case are series of pipes, refrigerated to very low tem-



CENTRIFUGAL COMPRESSOR was first to be used in the U. S. for refrigeration at a lube oil dewaxing plant. White material is ice.

RESEARCH IS PART of every refinery process, however new. Tests and experiments in laboratory are made to improve MEK Plant operations.

peratures on the outside. As oil flows through the pipes, wax begins to crystallize and becomes solid. To keep a film of wax from gradually building up inside the chilling pipes, a set of cutting knives revolves slowly inside each pipe, keeping the inside surfaces free of wax.

From the chillers, solvent-and-oil mixture in which solid wax is now present goes to rotating filter drums. Here the oil is strained through filter cloths, leaving wax on the outside of the cloth. The dewaxed oil flows from the filter drums through several vessels where heat is applied until the solvent is distilled off, making the valuable solvent available for use again. Wax removed from filter cloths is collected, the solvent is distilled off, and the solvent-free wax is sent to other refinery processes or made into commercial quality wax.

Dewaxed oil, free of solvent, is ready for the next step in the process of making premium quality lubricants. This may be, though not necessarily so, the *solvent extraction* process.

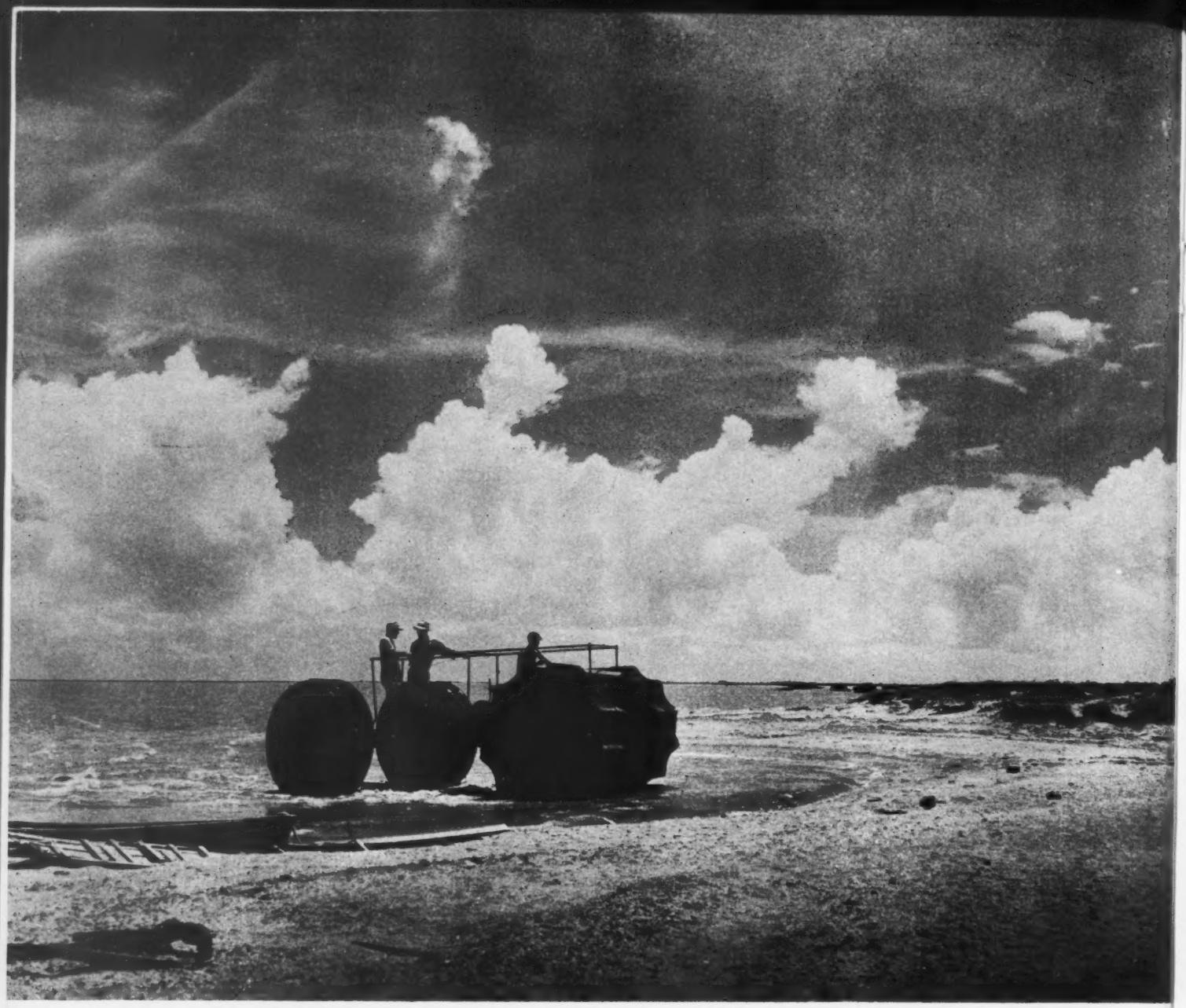
If the foregoing description sounds simple and easy, it is only because it was deliberately written that way. Actually, there is a great deal more to solvent dewaxing of lube oils than has been explained here. This purports to be nothing more than a brief, simplified sketch of the MEK dewaxing process.

The new plant at Baytown has a number of advantages over other types of dewaxing. The process can be carried on at higher temperatures than is possible with other solvents. Besides that, certain mechanical advantages have been put to use in the plant. For example, engineers in charge are justly proud of that fact that this is the first lube dewaxing plant in the United States to operate centrifugal compressors for refrigeration, instead of reciprocating compressors. The plant has two 2000 horsepower centrifugal compressors, only one of which need be used at any one time. Each compressor has a maximum speed of about 10,000 revolutions per minute! They have the advantage of being small and compact in comparison to the considerably larger reciprocating compressors. In fact, a single compressor at the MEK Plant does as much work as a whole shedful of reciprocating compressors at a companion plant across the street.

It is typical of Baytown people that they refuse to be content with operations as they are at the new unit. An MEK experimental unit which duplicates the operation of the full size plant is already in existence, and research on this equipment will point the way to future improvements of large-scale operations. Research at Baytown in the lube oil field takes several forms: evaluating new crude oils as possible sources of lube stocks, evaluating new process methods in an effort to make more oil from existing stocks, research to reduce costs of manufacturing, and constant research to improve quality.

Technicians have already found many ways to improve lube oils. They have discovered a rather impressive group of *additives*, so called because they are added to lubes to obtain or improve certain characteristics. There are additives to slow down deterioration, to inhibit corrosion, to improve sludge dispersive quality, to stabilize oil body at changing temperatures, to resist high pressures, and to do all the other things that make for quality in motor oils.

MEK not only makes 997; it will make a *still better* 997 in the years ahead.



NOT A MONSTER rising from the sea, but a type of marsh buggy that floats in about four feet of water. It can operate in mud or grass, or over small stumps, and in the shallow water of protected bays. It carries six men or the equivalent weight in equipment.

TRANSPORTATION for Oil Hunters

Humble geophysicists adapt odd-looking but useful vehicles to speed up their search for oil

HUMBLE geophysicists might well have as their motto: "When new methods of transportation are invented, we will try them."

Their attitude is more realistic than adventurous. It is an attitude dictated by necessity, because of the type of work the geophysicist is called upon to do. He cannot confine his search for oil to those comfortable, charted areas served by highways and easily accessible by ordinary motorcar. The terrain over which he operates is usually difficult, and he must be equally at

home on land, at sea, and in the air.

Some oil reservoirs yet undiscovered may lie in the heart of a swamp, under the oozy mud of coastal shores, or under the sea itself. In order to reach and explore these areas, the enterprising geophysicist must make use of all kinds of vehicles, calling on them to do work for which they were never originally intended, but for which they are singularly well adapted. In addition to conventional trucks and passenger cars, he must use all sorts of boats, weasels, and a wide variety of odd-looking amphibious vehicles which fit his needs of the moment and the particular terrain over which he is working.

Boats used by Humble geophysicists include the trim submarine chaser, the speedy aircrash rescue boat, the sturdy shrimper, and many lesser craft down to the bateau so common to the swamps of Louisiana. One of the few war-born vehicles that has proved useful to exploration crews is the weasel. This awkward-looking hybrid, a sort of cross between a boat and a caterpillar tractor, is particularly useful in areas where there are shallow, protected bays. It is put to good use on dry land, thick sand, and in the water. Separate weasels have been fitted out to perform the functions of each of the trucks found on conventional seismograph operations. These include operating trucks with light-tight cabs used to develop the photographic records resulting from dynamite explosions; reel trucks to lay out cables, and seismograph pickups.

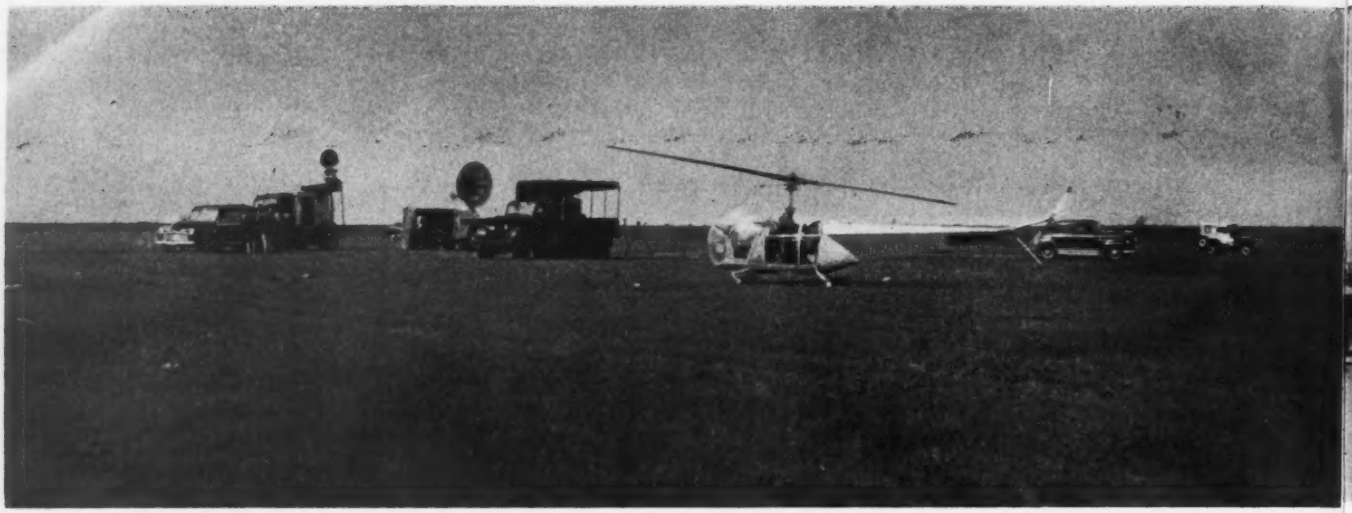
In larger areas of swamp and shoreline operations, marsh buggies with tremendous hollow metal wheels have already proven their worth. The giant wheels of these vehicles serve both as floats and as driving means in water or soft marsh. On mud, two types of marsh buggies have been especially useful; each is a modification of previously proven buggies. The first type uses broad wooden slats instead of tires. The other type employs six large, hollow steel wheels. In this latter type, the conventional trailer is replaced with a sled which slides on mud, exactly as conventional sleds slide on snow. A series of sleds can be fitted out, corresponding to the group of trucks used when geophysics crews can operate on roads.

The most publicized of all wartime vehicles, the jeep, finds plenty of work to do in exploration operations. During the war a device known as the Odograph was developed, and Humble uses jeeps as carriers for the Odograph. This instrument, installed in a jeep, automatically draws a map showing the path which the jeep has traveled. Particularly valuable in those areas for which no accurate maps are available, the Odograph is extremely sensitive. Strange as it may seem, after the instrument is "zeroed" or balanced with relation to the jeep's metal surfaces, the changing of a flat will throw the Odograph out of balance. It is zeroed with the spare on, and the steel rim holding the flat tire will be either harder or softer, and will have different magnetic properties, than the rim holding the spare. Buried pipe lines cause trouble by throwing Odograph readings "off the track."

Also valuable in uncharted areas is the helicopter, which has been described as a flying windmill, or an eggbeater with wings. The helicopter is the latest tool to be put to work by Humble geophysicists. A versatile aircraft, it can travel at high rates of speed or hover motionless at any desired height. In it, the geophysicist can carefully examine the ground from a vantage point several hundred feet in the air and determine what positions are most suitable for his operations. He can also choose the routes his trucks and drills should follow in order to get to the scene of operations with minimum difficulty and in the shortest time. The helicopter, acting as a target for radar, vastly simplifies the geophysicist's problem of surveying in areas such as portions of West Texas, where rugged terrain and lack of roads or even trails makes conventional surveying methods time-consuming and often inaccurate.

If all the odd vehicles used to transport exploration crews and their equipment were brought together in one place, they would make a grotesque collection indeed. But each serves a particular purpose, and each is a valuable tool in the search for oil. It is not how they look, but what they do that counts. One is almost reminded of Oliver Goldsmith's good sense in declaring that he " . . . chose his wife, as she did her wedding gown, not for a fine glossy surface, but such qualities as would wear well." Some of the geophysicists' vehicles might not take beauty prizes, but they do a good job and they have qualities that "wear well."

THE WEASEL was developed during the war, and is a sort of awkward-looking hybrid between a boat and a tractor. As used by Humble, the weasel is equally at home on land or in shallow water. A real workhorse, it is especially useful to geophysicists in shallow, protected bays.



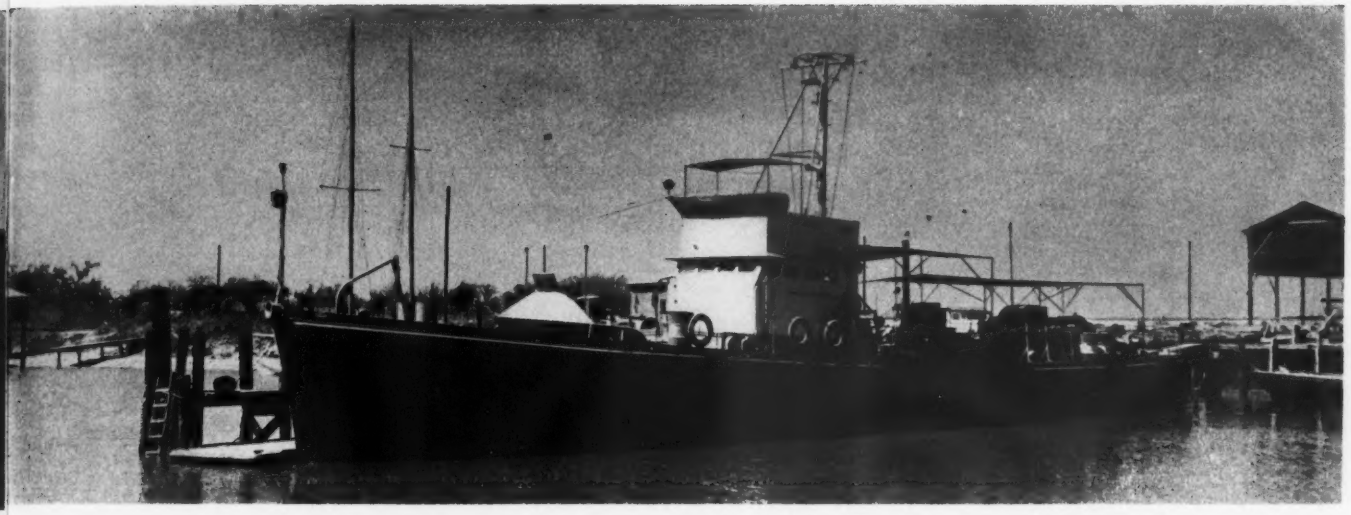
TAKEN ALL TOGETHER, the vehicles used to transport exploration crews make an odd-looking group. There are weasels, marsh buggies, helicopters, jeeps, and other special carriers. More useful than beautiful, each serves a particular purpose, each is a valuable tool in the search for oil.

On Land and in the Air

THE GOING GETS ROUGH, as it so often does, and tractors have to be pressed into service to haul vehicles and other equipment to the location.

THE ODOGRAPH, or instrument inside this jeep, automatically draws a map showing the route over which the jeep has been traveling. It is quite sensitive; changing flat will throw its delicate mechanism out of balance.

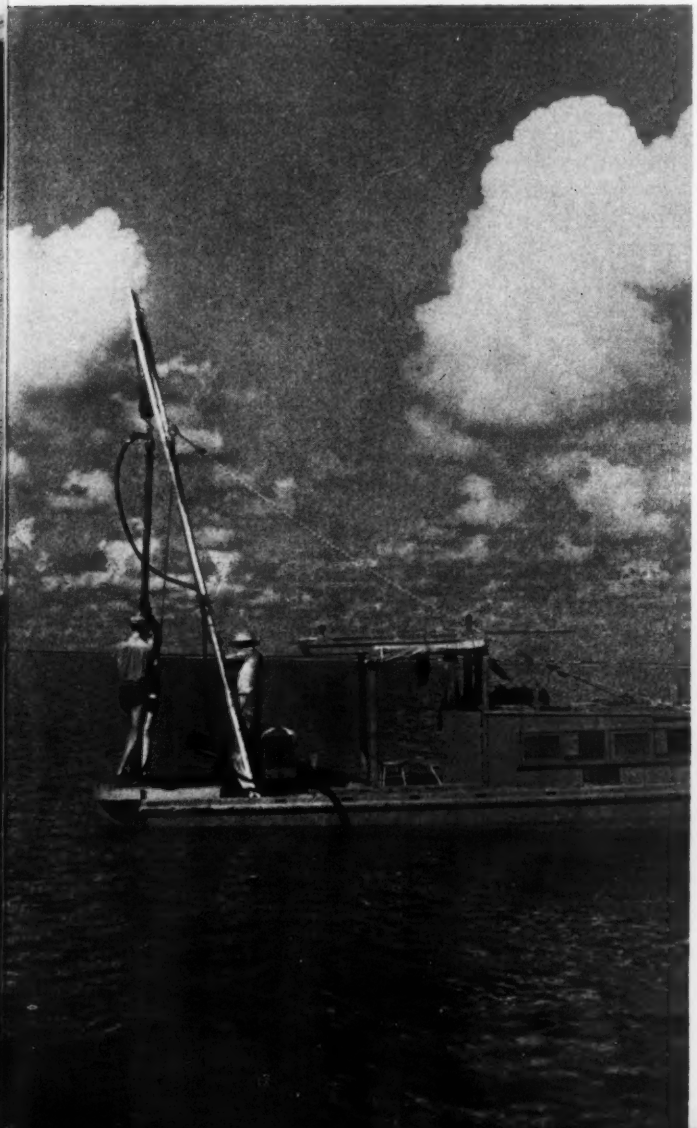
SHOOTING TRUCK is equipped with two types of radio for calling helicopter, party chief, engineer. Safety devices prevent accidental firing.



THIS SUBCHASER, converted by Humble to geophysics use, is Diesel powered and outfitted for gravimetric surveying offshore in the Gulf of Mexico. *The Borregas* is equipped with radar and with ship-to-ship and ship-to-shore communications. All work aboard is done electrically.

At Sea and in the Marshes

SHOT HOLES are drilled underwater from this boat. Another boat follows after and places charge. Equipment and debris are removed after firing.



MARSH BUGGY operating in six feet of swamp. Operator's cab is mounted on two pirogues, or small flat boats used in marshes.

STURDY AND USEFUL, this boat has been equipped with winches, pulleys, and other tools to make it valuable for offshore geophysics work.

GOOD HOUSEKEEPING Is Good Business

GOOD housekeeping is good business. With Humble, that is more than a policy; it is a philosophy. All the way up and down the line in Company operations between points of production and points of sale, the habit of keeping things as neat and clean as possible has become a deep-rooted part of Humble's working life.

There is more to Humble's philosophy of cleanliness than the housewife's pride in "keeping things nice," though that is part of it. It is more than a means of maintaining self-respect and the respect of others, though both are important. In substance, it amounts to this: *it is part of the Humble way of doing business.* A clean, orderly, well-kept operation is a safe operation; an efficient operation; an operation which declares for itself that here are men who know their business.

True, it takes time and money and effort to maintain high standards of good housekeeping, especially when one's stock-in-trade is a commodity as naturally messy as crude oil. It would be easy for those in whom the philosophy of cleanliness is less firmly rooted to fall back on that mossy excuse, "Too busy to clean up." And Humble people *are* busy—busier today than ever before with the important task of supplying record volumes of petroleum and its products. Nevertheless, they know that the time, money, and effort spent in good housekeeping pay big dividends in creating safe working conditions, in building their own morale, in winning public approval, and in prolonging the life of properties and equipment.

That is why machinery on Humble drilling rigs is always painted and well cared for. That is why floors, pumps, and buildings at a Humble Pipe Line Company pump station are kept as neat and clean as soldiers on dress parade. That is why Humble's lease batteries and storage tanks in the field are so neatly painted, usually in bright and shining aluminum, that they always look like new. That is why so much care and effort go into the maintenance of grounds, shrubbery, and housing in Company field camps. There is no disorder, no filth, no accumulation of grime and grease, no untrimmed hedges or shaggy lawns.

So it is that, throughout the Company's operations, the Humble way of keeping house makes itself evident. Even exploratory crews, who figuratively carry their houses on their backs and whose home is wherever the search for oil takes them, know the importance of good housekeeping. These men work with delicate and expensive instruments and equipment. To them, keeping their house in order means primarily taking good care of their tools, keeping them in good working order, and protecting them from the mud, sand, and water of areas being explored.

And if visitors at Baytown refinery are impressed with not seeing any oil, it is only because refinery people keep oil where it is supposed to be: inside stills and other process equipment, flowing through lines, or confined within neatly painted storage tanks and vessels. Leaks are bad for three reasons: They waste valuable materials, they are unsightly, and they create unsafe working conditions. Even in those places where coke and tar accumulate, careful handling disposes of those residues as quickly as possible.

It is almost always the case in Humble operations that steam or water, or both, are available to give equipment and premises a good "hosing down" as often as needed. The ubiquitous wiping rag is constantly at hand, ready to be whipped out and used on oil and dirt wherever those offenders are found. Baytown refinery alone spends about $50,000 on wiping rags in a single year!

Nowhere, of course, is good housekeeping more important than in Humble's retail service stations. There are the Company operations most directly in the public eye; under the glaring light of public opinion, cleanliness is no optional matter; it is a *must.*

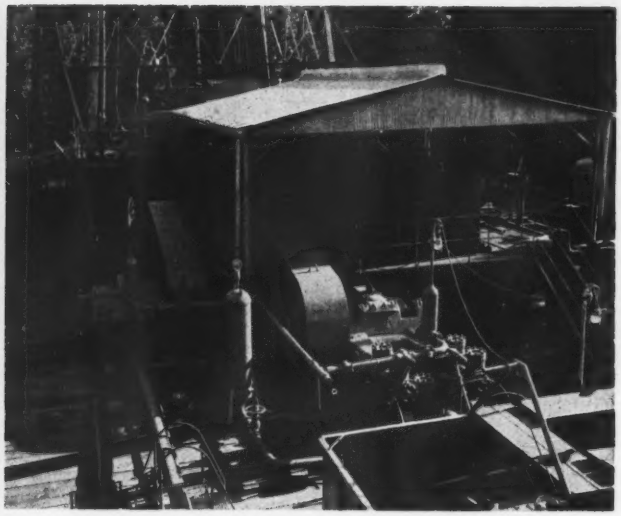
Humble pioneered in clean service stations in Texas, placing special emphasis on clean restrooms. From the earliest days of the Company's retail operations down to today's bustling program of sales expansion, clean stations and especially clean restrooms have had top billing in every sales campaign.

Meetings, literature, visual aids, contests—all kinds of education and inspirational tools — have helped Humble salesmen learn the eternal truth that, to the travel-weary motorist, cleanliness is indeed next to godliness. Two strip films on the subject have been prepared and shown to salesmen everywhere. These are "Good Housekeeping Rings the Bell" and "Through Your Customer's Eyes." Last year a "Pitch in and Clean Up" campaign kept mops and brooms and dust rags flying; this year it is "Check Up and Clean Up" with the Sales Manager's Plaque going to those stations that meet high standards. Last year the "Flying Phantom" visited every Humble station and made on-the-spot awards for cleanliness and service. This year the Phantom will ride again.

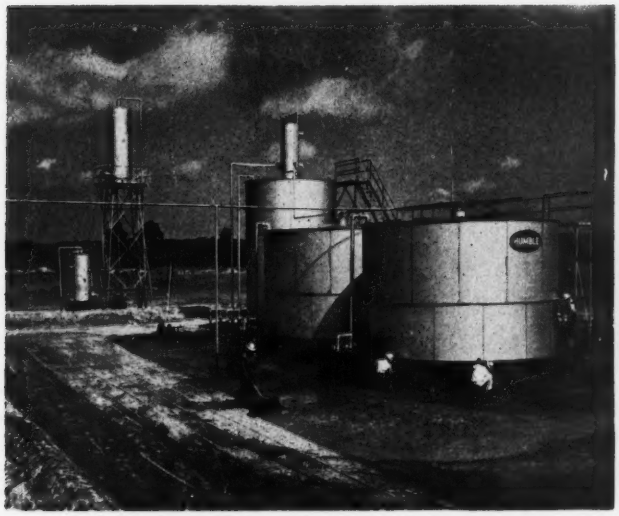
Check cards placed in restrooms at Company-operated stations invite customers to "Give Us Your Verdict, Please." By far the majority of those verdicts are good, bearing out the fact that Humble salesmen are matching high quality products with equally high standards of service and cleanliness. These salesmen know that cleanliness is not only important, but vitally necessary, to the successful operation of a service station.

Though it is understandably true that cleanliness and orderliness are emphasized more among sales people because of their constant contact with the motoring public, the philosophy of cleanliness is subscribed to with equal enthusiasm in all branches of Company operations. Humble people everywhere are proud of the fact that good housekeeping is part of the Humble way of doing business.

1. GEOPHYSICS equipment, like these gravity meters, must be cleaned, checked for accuracy to insure good results in field.

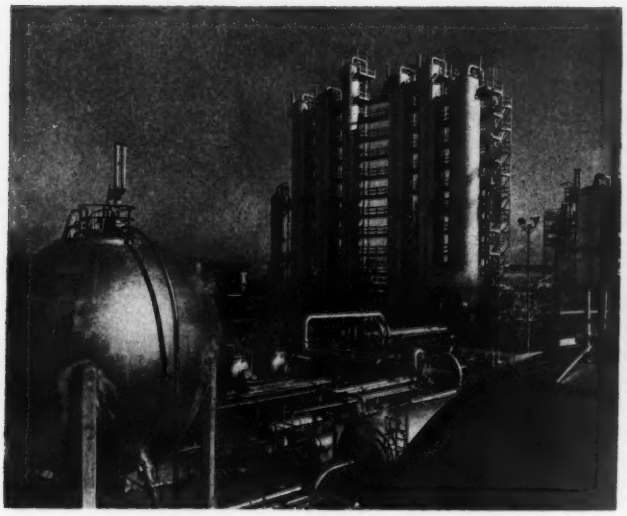


2. NEATNESS, difficult to maintain on a drilling rig, is essential to efficient operations. Everything here is neat and clean.



3. PRODUCTION good housekeeping includes painting and spreading weed control chemicals. Extra care keeps the equipment neat.

4. PIPE LINE station operators take pride in gleaming floors, neatly painted engines. Mops, wax, dust rags keep this station spotless.



5. REFINERY equipment is protected and kept attractive by regular application of paint. Towers and tanks glisten in aluminum coats.

6. NEED FOR service station cleanliness is stressed in Humble's sales training. Company pioneered in clean restrooms in Texas.

By the way . .

Humble Way Wins Recognition

In international competition THE HUMBLE WAY recently won second place among company magazines using color illustrations. More than 600 U. S. and Canadian publications were entered in the annual convention contest sponsored by the International Council of Industrial Editors at Wilwaukee in May.

They Have Retired

Eight members of the Humble Companies have retired from active work during the past two months and have begun to enjoy the benefits of the Company's Annuity plan.

OLIVER H. MCGEE, telegraph operator at Navasota, retired on March 25 . . . LOUIS W. WELCH, janitor at the technical and research division at Baytown refinery, on April 18 . . . PEARL F. HEFNER, separator pumper at Baytown refinery, on April 25 . . . ROBERT D. MARTIN, zone supervisor at Baytown refinery, on May 3 . . . WILLIAM A. CAMPBELL, field engineer at Station A, but working at McCamey when he retired on May 15 . . . FLOYD M. HOUSTON, stock gauger and assistant delivery man at Webster Pump Station, on May 17 . . . ALFRED J. RAYMOND, carpenter in the Geophysics shops in Houston on May 24 . . . and ANDREW C. ESTES, telegraph operator at Benavides, on May 30.

Deaths

Since our last report in these columns, 12 employees and five annuitants have died.

CONCIE ROSS, 52, engineer at Hastings Station, died on April 14 . . . JOHN C. MORING, 64, lease pumpergauger at Gladewater, on April 17 . . . CHARLES B. KEETH, 55, lease pumpergauger at Talco, on April 18 . . . CLIFTON M. SMITH, 53, chief clerk at San Antonio refinery, on April 18 . . . JERRY H. CHAKA, 38, helper at Baytown refinery, on April 19 . . . EBB B. OWEN, 48, heavy duty pumper at Vernon, on April 23 . . . THOMAS J. GAVRANOVIC, 45, roustabout at North Katy, on April 25 . . . FRED L. BUSSA, 60, Pipe Line Company oil dispatcher in Houston Office, on April 26 . . . ALBERT M. BURKHALTER, 60, first class helper at Baytown refinery, on April 30 . . . LAWRENCE G. CALK, 32, first class machinist at Baytown refinery, on May 1 . . . JIM JEFFERS, 51, Pipe Line engineer at Gladewater, on May 4 . . . and CALDWELL L. MCRAE, 50, lease pumper-gauger at Tomball, on May 10.

Annuitants who have expired during the past two months are: JOHN D. YIELDING, who was a roustabout at Cross Cut until his retirement on January 1, 1936, died on April 12 . . . OZRO P. GARLAND, transportation foreman at the Gulf Coast terminal until his retirement on April 8, 1939, died on May 1 . . . FRANK L. STOREY, who retired as connection foreman at Hull Station on February 12, 1941, died on May 24 . . . NEWT BRASHER, roustabout at Goose Creek until his retirement on March 27 of this year, died on May 25 . . . and IRVIN E. OTIS, who had retired from his post as supply and generator man at Baytown refinery on November 30, 1947, died on June 1.

JACKSON LEE NESBITT of Kansas City painted the new MEK Plant picture appearing on the cover and the Pipe Still No. 3 painting on Pages 12 and 13. Both are egg tempera works of the 35-year old artist who has won considerable recognition and a number of awards and scholarships for his detailed and realistic portrayal of industrial and rural subjects. His first appearance in THE HUMBLE WAY was in the July-August 1947 issue. His "Baytown Railroad Loading Docks" painting was reproduced as the cover illustration for the Company's Annual Report this year.

The HUMBLE WAY

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Published every other month for employees and stockholders

HUMBLE OIL & REFINING COMPANY

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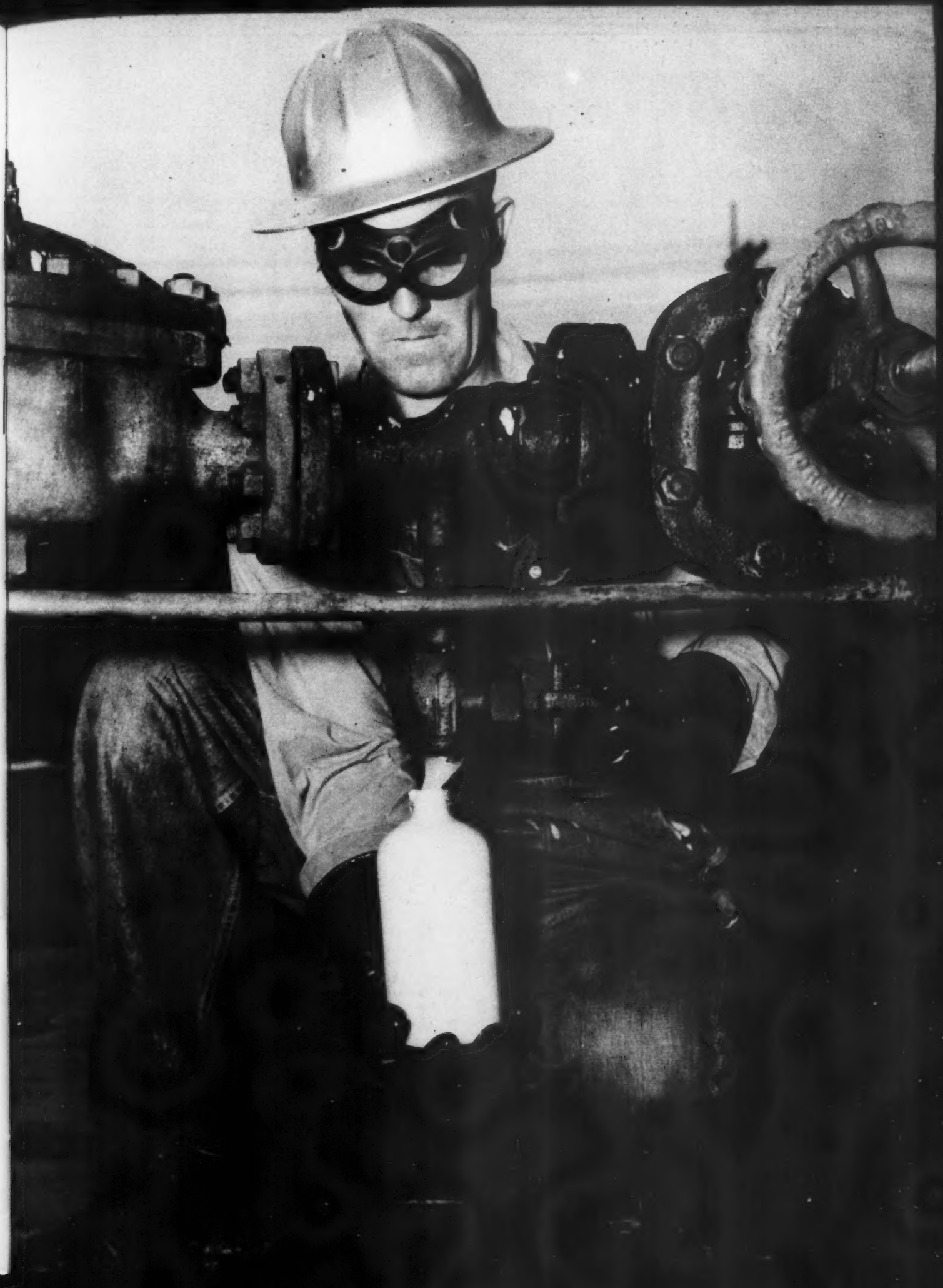
Art credits: Front cover and Pages 12 and 13, Jackson Lee Nesbitt; Page 8 and outside back cover, E. M. Schiwetz.

Wax drawn from Baytown refinery's new MEK Plant hardens into white crystals. Plant solvent removes wax as important step in making premium quality motor oils. (See *MEK Makes 997*, Page 14)



PROGRESS *with* PETROLEUM

Rough and uncertain roads made early-day travel anything but the pleasure it is today. In fact, travel has (and with good reason) a common origin with "travail," meaning: "painful effort, torment."

Petroleum has made roads better and road-building easier. It furnishes materials from which roads are made, and provides power and protection for road-building machinery. Gasoline taxes help pay for roads.